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BRACHYDERES INCANUS (COLEOPTERA: CURCULIONIDAE): NEW RECORDS AND CONFIRMATION OF ITS ESTABLISHMENT IN NORTH AMERICA

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Abstract.—*Brachyderes incanus* (L.), a brachyderine weevil considered a conifer pest in Europe, has been recorded in the curculionid literature from Missouri and Canada, but the validity of these records and the establishment of North American populations have been questioned. Records of this species from Massachusetts and New York and its injury to ornamental conifers, published in the economic literature but largely overlooked, are reviewed; new state records are given for Connecticut and Pennsylvania; and additional localities are cited for Massachusetts, New Jersey, and New York. The life history and economic importance in Europe are summarized, and an adult diagnosis is provided.

Brachyderes incanus (L.) is an Old World brachyderine weevil that ranges throughout much of northern and middle Europe south to Italy and France and east to the Balkan Peninsula. Known in the German economic literature as "Graue Kiefernnadelrüssler" or "Gemeine Graurüssler," this conifer pest usually is important only in established plantations, although larval injury may threaten the existence of seedling nurseries. Scotch pine, *Pinus sylvestris* L., is a common host plant, with other pines and genera of conifers also serving as hosts.

My interest in *Brachyderes incanus* was prompted by Anne T. Howden. In preparing a petition to the International Commission on Zoological Nomenclature concerning the weevil generic names *Brachyderes, Cycloderes,* and *Thylacites,* she was interested in knowing whether this Palearctic species is established in the Western Hemisphere. She considered published records from Missouri and Canada as possibly spurious, or at least as inconclusive regarding the establishment of New World populations. No voucher material has been located for an early Missouri record (1880's) that may be based on a misidentification (see discussion under History and Distribution in North America). Because D. R. Whitehead (Systematic Entomology Laboratory, Agricultural Research Service, Washington, DC) had told her I collected a specimen of *B. incanus* at the Longwood Gardens (Chester Co.), Pennsylvania in 1974 (identified by R. E. Warner), she encouraged me to try to determine if this species is still present in the arboretum. Having collected 12 specimens there in August 1984, I can confirm the establishment of *B. incanus* in North America.

Here, I summarize information on the biology and economic importance of *B. incanus* in Europe, review its history and distribution in North America, call

attention to authentic but largely overlooked records published in the U.S. Department of Agriculture's *Insect Pest Survey Bulletin* in 1928 and 1934 and an unverified record from a USDA list of important insects for 1942, and provide a diagnosis of the adult.

Life History and Importance in Europe

The following outline of phenology and habits of *B. incanus* in Europe was drawn from Butovitsch (1932), de Fluiter and Blijdorp (1933a, b; 1935), Schwerdtfeger (1936), Adlung (1964), Schindler (1974), Dieckmann (1980), and Harde (1984). The most detailed treatment of biology, with photographs of life stages and injury to conifers, is that of de Fluiter and Blijdorp (1935).

Overwintered adults become active in early spring, and females deposit groups of 30–125 eggs in the soil. A maximum fecundity of 1200–1300 has been recorded. Eggs hatch in about three weeks, and larvae begin to bore into and strip bark from roots of their hosts, especially at the junction of a large and small root. Roots up to 3 mm in diameter may be killed. Pupation occurs during July and August, adults emerge after 3–4 weeks, and females begin to oviposit after about two weeks.

Some authors state that only adults of this univoltine species overwinter, but it appears that eggs and larvae also overwinter. Some summer females apparently do not complete oviposition before hibernating; during summer, overwintered adults may overlap with those developing from eggs or larvae that passed the winter. The seasonal history of populations probably varies according to locality and length of the growing season.

Adults feed on conifer needles, producing a characteristic serrated appearance and dripping resin, and occasionally attack the bark. Heavily infested trees may be detected by a resinous odor and a whitish cast to the shoots that results from the copious deposits of resin. Injury is said to be more severe in dry seasons or under conditions of poor soil fertility.

History and Distribution in North America

The first mention of *B. incanus* in the New World appears to have been published by LeConte and Horn (1883: 439), who noted that this introduced species "has occurred at St. Louis." The citing of a locality suggests that they had seen material from that city, but no specimens of *B. incanus* are present in the Le Conte or Horn collections, which are housed at the Museum of Comparative Zoology at Harvard University (A. F. Newton, Jr., pers. comm.). Because the length given for their weevil (36 mm) is more than three times that of *B. incanus* (7.0–11.5 mm), it seems unlikely that this was the species present at St. Louis.

Brachyderes also has been recorded from Canada (O'Brien and Wibmer, 1982). The basis for this record is a specimen (now in the possession of C. W. O'Brien) from the Warren Knaus collection, labeled "Can." (A. T. Howden, pers. comm.). Two similarly labeled specimens from the Knaus Collection, determined by C. W. O'Brien, are in the Kansas State University collection (H. D. Blocker, pers. comm.). Another specimen bearing a "Can." label, part of the F. Knab collection, is housed at the National Museum of Natural History (NMNH) (D. R. Whitehead, pers. comm.). The origin of these specimens may actually have been Canada, although no Canadian specimens of *B. incanus* have been located in the Canadian

National Collection or the Royal Ontario Museum (Howden, pers. comm.). It also is possible that the specimens were collected at Canada, *Kansas*, a small town situated about 30 miles east of McPherson where Knaus published the local newspaper (Dean, 1938).

Two records published more than 50 years ago in the economic literature and overlooked by weevil specialists represent the only reliable information available on *B. incanus* in North America. Bourne (1928) reported that in early June 1928 large numbers of this weevil caused "considerable injury to blue spruce" (*Picea pungens* Engelm.) in eastern Massachusetts. Further examination revealed that nearly all spruces and most of the pines, except white pine (*Pinus strobus* L.), had been attacked. It was noted that H. S. Barber identified the specimens, but Bourne did not mention an exact locality; there is material in the NMNH collection from Abington, Massachusetts, June 8, 1928, on Koster blue spruce from Holland and June 9, from Bay State Nursery, Abington, on spruce. Schaffner (1934) stated that specimens of *B.* (= *Thylacites*) *incanus*, determined by L. L. Buchanan, had been collected on blue spruce, October 11, 1934, at North Roslyn, New York, and that control suggestions were needed. The NMNH has voucher specimens from that Long Island, New York collection. The U.S. Department of Agriculture (1942) reported New Jersey as a new state record, noting this weevil was injuring conifers in a nursery, but no New Jersey specimens collected before 1945 have been found.

The following new records of *B. incanus*, obtained from the insect collections of Cornell University (CU), Museum of Comparative Zoology (MCZ), Pennsylvania Department of Agriculture (PDA), and NMNH, confirm the establishment of this Palearctic weevil in eastern North America.

CONNECTICUT: Westport, 4 Aug. 1953, on white pine (NMNH); Hartford (?loc.), Liebeck Collection (MCZ). MASSACHUSETTS: Rockland, 22 Aug. 1940, E. W. King (NMNH). NEW JERSEY: Passaic Co., Wanaque Res., 9 Sept. 1966, E. E. Simons, on red pine (PDA); Washington Crossing, 18 June 1945 (submittal date), H. B. Girth, on red pine, and 13 Oct. 1964, J. Beach, on larch (NMNH). NEW YORK: Glen Head, 11 May 1937; Hempstead, 22 Sept. 1935, on pine needles (CU); Jericho, 25 Oct. 1944, Tuthill, on red pine; Patchogue, 25 Sept. 1933, L. A. Gilbert, in nursery on pine; Roslyn, Sept. 1937, Mrs. P. S. Allen, in house, and 8 Dec. 1943, Plummer, with fallen Austrian pine needles (NMNH); Saratoga State Nursery, 9 Oct. 1958, R. H. Everitt (CU). PENNSYLVANIA: Chester Co., Longwood Gardens, 20 Aug. 1974, A. G. Wheeler, Jr., on Scotch pine, and 23 Aug. 1984, A. G. W., on Japanese larch (PDA).

With little doubt, the New World origin of *B. incanus* can be attributed to importation with European nursery stock. Label data on Abington, Massachusetts specimens indicate its collection from spruces that originated in Holland (NMNH, MCZ). The considerable numbers already present then at Abington (Bourne, 1928) suggest an established population and its earlier introduction. Because millions of conifers and other plants were imported to northeastern United States in the early twentieth century (e.g. Atwood, 1910; Felt, 1910), multiple introductions of this pest seem probable. A separate introduction may explain the occurrence of *B. incanus* on Long Island, New York during the 1930's, or shipments of conifers from infested nurseries in eastern Massachusetts may have been responsible for the New York populations. Once established on Long Island, *B. incanus*

was spread through plant shipments. A Patchogue specimen collected in 1933 can be traced to a shipment of stock from a Roslyn nursery (NMNH).

Recognition of Adult *Brachyderes incanus*

The principal morphological characters allowing *B. incanus* to be placed in the subfamily Brachyderinae are: scrobe lateral, sharply defined, strongly deflexed so that scape usually rests below eye when retracted next to head, and prothorax with anterior margin truncated, margin not produced into rounded lobe behind eye (van Emden, 1944; Kissinger, 1964).

Adults of *B. incanus,* the sole member of *Brachyderes* occurring in North America, can readily be distinguished from other brachyderine weevils by the following combination of characters: tarsal claws connate at base, hind tibia with corbel open, head not constricted dorsally behind eyes, elytral humeri absent, and ascending comb of hind tibia longer than width of hind tibia at base. The adult habitus is figured in Schindler (1974: 257); Amann (1961: 14) and Harde (1984: 291) provide a color illustration of the adult.

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